

AN ANNOTATED CHECKLIST OF CONTINENTAL NORTH AMERICAN SOLIFUGAE WITH TYPE DEPOSITORIES, ABUNDANCE, AND NOTES ON THEIR ZOOGEOGRAPHY

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ABSTRACT. A checklist of North American solifugae is presented along with their type localities, location of types, known numbers of specimens of each sex collected and the biomic distribution of each species. One hundred ninety-six solifugid species have been recorded in mainland North America, mostly from the United States. Forty-eight species are known from types only. Fifty-five species are known from males only and twenty-four are known from females only. The large hot deserts, Chihuahua and Sonora, contain the majority of collected solifugid species.

Keywords: Solifugids, wind spiders, sunspiders, checklist, biomes, distribution, type depositories.

Muma's (1976) privately published review of solifugid families of the world included an annotated checklist of Western Hemisphere solifugid species. Since that time there have been several publications describing new species, synonymies and group revisions of this arachnid taxon in North America (Brookhart & Muma 1981, 1987; Vázquez 1981; Muma 1986/1987 (Muma published the same article in both years with different publishers); Muma & Brookhart 1988; Muma 1989; Brookhart & Cushing 2002, 2004). Harvey's (2003) monumental publication brings up to date the taxonomic status and to some extent the general distribution of solifugids worldwide. Although he refers to Muma's system of classification, Harvey does not include the species groups as used by Muma (1951, 1970, 1989) in his work on Western Hemisphere solifugids. Harvey denotes the type locality but not the type repository. The general distribution of solifugids is given in terms of geopolitical areas, i.e. provinces, states, etc. but not in the more significant biomic realm.

In addition, a zoogeographic paper written but not published by Martin Muma shortly before his death was given to the authors. In this paper Muma attempted to identify the locality of collected, identified solifugids in terms of generally accepted biomes or smaller biotic

areas. He also noted the number of specimens collected as determined by the literature and his own personal experience while examining materials from museum collections and from private collections. He attempted to enumerate species as abundant, common, uncommon or rare. We have listed the exact number known when less than 10, used "several" when the number is from 10–20 and "numerous" when more than 20 specimens of a species have been recorded.

This is an attempt to clarify the fine work of Muma and Harvey and isolate the present systematic state of the Solifugae of North America as well as including zoogeographical data from the work of the late Martin Muma augmented by the subsequent work of the authors. It is hoped that this information will be of use to those involved in the studies of solifugid taxonomy, systematics, ecology and biogeography. We have cited the original publications describing the taxonomy of each species. The reader is referred to Harvey (2003) for a complete list of publications citing each species.

Twelve families of Solifugae are found worldwide, two of them in North America, the Eremobatidae and the Ammotrechidae. The Eremobatidae are divided into the subfamilies Eremobatinae and Therobatinae. At the time

of Muma's 1976 publication the continental North American solifugid fauna consisted of the Eremobatinae with three genera, 44 species, and 12 unplaced species. The subfamily Therobatinae contained four genera and 46 species. The Ammotrechidae consisted of five subfamilies of which only two were found in continental North America, the Ammotrechinae and the Saronomoinae. The North American Ammotrechinae included four genera and 17 species while the Saronomoinae had but one genus with three species. We did not include those species that are considered *nomen dubia*.

Extensive solifugid population studies have been conducted at various locations in the United States (Muma 1963; Allred & Muma 1971; Brookhart, 1972; Muma 1974a, 1974b, 1976, 1979, 1980; Brookhart & Brantley 2000) mainly in the Chihuahuan Desert and the adjacent grasslands. In addition various collecting trips were undertaken by Muma and Brookhart and by Brookhart and Brookhart in essentially the same general areas. Most of these projects utilized pitfall traps. In assessing the known number of specimens, we relied on our personal collecting data, data from examination of institutional collections and information from the literature. The abundance of immatures is not reflected in this data. Immatures are difficult to identify to species and early instars are often overlooked in examination of samples.

Solifugid environments are usually regarded as xeric and include deserts, grasslands, wind, river and beach dunes. Schmoller (1970) considered them as indicative of deserts or xeric conditions. Certain of the environments are not xeric from the standpoint of macro-habitat but may be in terms of micro-habitat, e.g. beach sand, montane or arboreal inhabitants. The zoogeographic indicators used in this article include two recognized hot deserts, Chihuahua and Sonora and have included the Sinaloan thornscrub of Brown (1994); two Cold Deserts, Mojave and Great Basin; and three arid grasslands, Interdesert grassland, Cold Dry grassland, and High Dry grassland and are based mainly on K uchler's (1985) designation. In addition, smaller biotic communities as listed by Brown (1994) and K uchler (1985) are included particularly for the state of California in the United States and also parts of Mexico.

Since most biogeographers refer to grasslands as either short grass or tall grass a brief description of the areas included is necessary. We have relied extensively on K uchler (1985) and Brown (1994) in making these distinctions. *High Dry Grassland*: K uchler's (1985) sagebrush steppe/wheatgrass-needle grass steppe; virtually all of Colorado east of the Rocky Mountains; part of northwest Arizona; much of the northern third of New Mexico; and the northwest corner of Texas. It also includes small western pieces of Oklahoma, Kansas and Nebraska and most of the southeastern third of Wyoming. *Interdesert Grassland*: The (Gama-tobosa shrub steppe) of K uchler (1985) including a north-south extreme western strip of New Mexico, most of Arizona north and east of the Sonora Desert, and south and east of the Mohave and Great Basin deserts, excepting perhaps part of the northwest corner of the state. *Cold Dry Grassland*: Most of Montana and Idaho, western South and North Dakota; the Columbia/Snake River Basin in Washington and Oregon; the northern one third of Wyoming; parts of the western Canadian provinces; the southwest corner of Saskatchewan, a southern strip of Alberta; and the southeastern corner of British Columbia. The California biotic communities included are the California sage; California steppe; California grassland; and California chaparral.

Type Depositories of North American Solifugae.—AMNH-American Museum of Natural History, New York, New York, USA; ANS-Academy of Natural Sciences, Philadelphia, Pennsylvania, USA; BMNH-British Museum of Natural History, London, United Kingdom; BNHM-Boston Society of Natural History, Boston, Massachusetts, USA; BYU-Brigham Young University, Provo, Utah, USA; CAS-California Academy of Science, San Francisco, California, USA; CUM-Cornell University Museum, Ithaca, New York, USA; DEZC-Dipartimento di Entomologia e Zoologia, Turin, Italy; DMNH-Denver Museum of Nature and Science (formerly Denver Museum of Natural History), Denver, Colorado, USA; FSCA-Florida State Collection of Arthropods, Gainesville, Florida, USA; IBUNAM-Laboratorio de Acarologia, Instituto de Biologia, Universidad Nacional Aut onoma de Mexico, Coyoacan, D.F., Mexico; MCZ-Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA;

MNNH-Museum National d'Histoire Naturelle, Paris, France; MNRJ-Museo Nacional Rio de Janeiro, Rio de Janeiro, Brazil; NMWA-Naturhistorisches Museum, Wien, Austria; SMF-Natur-Museum und Forschungs-Institut Senckenberg, Frankfurt am Main, Germany; UCBC-University of California at Berkeley, Berkeley, California, USA; UCR-University

of California at Riverside, Riverside, California, USA; USNM-United States National Museum, Washington, District of Columbia, USA; ZMHU-Zoologisches Museum der Humboldt Universität, Berlin, Germany; ZSM-Zoologisches Staatsinstitut ad Museum, Hamburg, Germany.

FAMILY EREMOBATIDAE Roewer 1934

Key to Subfamilies and Genera of Eremobatidae (males only)

(Taken from Muma 1987)

- 1. Leg 1 with one claw; chelicerae about twice as long as wide; small to large species Eremobatinae 2
- Leg 1 with 2 claws; chelicerae 2.5–3 times longer than wide; tiny to moderate sized species Therobatinae 6
- 2. Fixed cheliceral finger long, style-like or needle-like; mesoventral groove a crease, slot or cup-like structure; moderate-sized to large species. 3
- Fixed cheliceral finger short, sculptured and flanged; mesoventral groove a trough-like slot; moderate sized species. *Eremothera*
- 3. Mesoventral groove an indistinct hollow or crease that does not extend to the base of the fixed finger; anterior tooth absent *Eremorhax*
- Mesoventral groove a distinct crease, cup, or slot that may or may not extend to base of fixed finger; anterior tooth present. 4
- 4. Mesoventral groove short, not extending to base of fixed finger; apical striate or plumose setae of male flagellum complex not obviously modified or flattened 5
- Mesoventral groove long, extending to base of fixed finger; apical plumose seta of male flagellum complex obviously enlarged or flattened; covering part of the mesoventral groove. *Eremobates*
- 5. Palpal metatarsus, tibia, and femur provided with enlarged spine-like seta, but not robust, not aligned in a ventral row, not movable *Eremocosta*
- Palpal metatarsus, tibia, and femur provided ventrally with robust, obviously movable spine-like setae. *Horribates*
- 6. Fixed cheliceral finger strongly recurved, sigmoid, or S-shaped; mesoventral groove absent; both dorsal and ventral flagellum complex setae plumose, moderate sized species. . . *Chanbria*
- Fixed cheliceral finger style-like or needle-like, straight, curved, or undulate but not S-shaped or sigmoid; mesoventral groove present; dorsal flagellum complex setae striate, ventral setae striate or plumose 7
- 7. Fixed cheliceral finger with a mesoventral groove that may vary from a distinct crease to an elongate hollow or cup; dorsal flagellum complex simple or tubular; small to moderate sized species *Eremochelis*
- Fixed cheliceral finger without a mesoventral groove; dorsal flagellum complex hooked or spatulate; tiny to small species *Hemerotrecha*

Subfamily Eremobatinae Kraepelin 1934

Dataminae Kraepelin 1899:240.
 Eremobatinae Kraepelin 1901:116.
 Eremorhaxinae Roewer 1934:553 (synonymized by Muma 1951:41).

Genus Eremorhax Roewer 1934

Eremorhax Roewer 1934:553.
Arenotherus Brookhart & Muma 1987:3.

Eremorhax arenus

(Brookhart & Muma 1987)

Arenotherus arenus Brookhart & Muma 1987:10.
Eremorhax arenus (Brookhart & Muma): Harvey 2002:451.

Type material.—Male holotype and 4 paratype males from Palmdale, California, USA (FSCA).

Recorded specimens.—Eight males.

Distribution.—USA: California. Biome: Sonoran Desert.

Eremorhax joshui
(Brookhart & Muma 1987)

Arenotherus joshui Brookhart & Muma 1987:9.

Eremorhax joshui (Brookhart & Muma): Harvey 2002:451.

Type material.—Male holotype and female allotype from Jumbo Rocks, Joshua Tree National Monument, California, USA (FSCA).

Recorded specimens.—Numerous males and females.

Distribution.—USA: California. Biome: Mojave Desert.

Eremorhax latus Muma 1951

Eremorhax latus Muma 1951:44.

Arenotherus latus (Muma 1951): Brookhart & Muma 1987:11.

Eremorhax latus (Muma): Harvey 2002:451.

Type material.—Male holotype with no locality label (MCZ).

Recorded specimens.—Two males from southern Arizona.

Distribution.—USA: Arizona and probably Mexico. Biome: Sonoran Desert.

Eremorhax magnellus
(Brookhart & Muma 1987)

Arenotherus magnellus Brookhart & Muma 1987:5.

Eremorhax magnellus (Brookhart & Muma): Harvey 2002:451.

Type material.—Male holotype and female allotype from Lordsburg, New Mexico, USA (FSCA).

Recorded specimens.—Numerous males and females.

Distribution.—USA: New Mexico, Arizona and probably Mexico. Biome: Interdesert Grassland.

Eremorhax magnus (Hancock 1888)

Datames magna Hancock 1888:107.

Eremobates magnus (Hancock 1888): Kraepelin 1901:127.

Eremopus mexicanus Roewer 1934:564 (synonymized by Muma 1951:43).

Eremorhax magnus (Hancock): Muma 1951:43.

Arenotherus magnus (Hancock 1888): Brookhart & Muma 1987:5.

Eremorhax magnus (Hancock): Harvey 2002:451.

Type material.—*Datames magna*: Male holotype, Laredo, Texas, USA. Type deposition: unknown and type at present must be considered lost. *Eremopus mexicanus*: Male holotype from Mexico (SMF, RII/1353).

Recorded specimens.—Several males and females.

Distribution.—USA: Texas, New Mexico. Mexico: Chihuahua. Biome: Chihuahuan Desert.

Eremorhax mumai Brookhart 1972

Eremorhax mumai Brookhart 1972:3.

Arenotherus mumai (Brookhart): Brookhart & Muma 1987:6.

Eremorhax mumai Brookhart: Harvey 2002:451.

Type material.—Male holotype, Boone, Colorado, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Colorado, New Mexico. Biome: Chihuahuan Desert; High Dry Grassland.

Eremorhax pimanus
(Brookhart & Muma 1987)

Arenotherus pimanus Brookhart & Muma 1987:8.

Eremorhax pimanus (Brookhart & Muma): Harvey 2002:451.

Type material.—Male holotype from Saguaro National Monument, Pima County, Arizona, USA (FSCA).

Recorded specimens.—Five males and four females.

Distribution.—USA: Arizona, probably Mexico. Biome: Sonoran Desert.

Eremorhax puebloensis Brookhart 1965

Eremorhax puebloensis Brookhart 1965:154.

Arenotherus puebloensis (Brookhart): Brookhart & Muma 1987:4.

Eremorhax puebloensis Brookhart: Harvey 2002:451.

Type material.—Male holotype and female allotype collected at Pueblo, Colorado, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Colorado, Northern New Mexico, Northwest Texas, Northern Arizona. Biome: Chihuahuan Desert; High Dry Grassland.

Eremorhax pulcher Muma 1963*Eremorhax pulcher* Muma 1963:2.*Arenotherus pulcher* (Muma): Brookhart & Muma 1987:7.*Eremorhax pulcher* Muma: Harvey 2002:451.**Type material.**—Male holotype and female allotype, Mercury, Nevada, USA (AMNH).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: Nevada, Arizona. Biome: Mojave Desert; Great Basin Desert.*Eremorhax tuttlei*

(Brookhart & Muma 1987)

Arenotherus tuttlei Brookhart & Muma 1987:9.*Eremorhax tuttlei* (Brookhart & Muma): Harvey 2002:451.**Type material.**—Male holotype and female allotype from Yuma, Arizona, USA (FSCA).**Recorded specimens.**—Ten males and three females.**Distribution.**—USA: Arizona. Biome: Sonoran Desert.**Genus *Eremocosta* Roewer 1934***Eremopus* Roewer 1934:561.*Eremocosta* Roewer 1934:569 (type species only).*Eremocantha* Roewer 1934:571.*Eremorhax* Roewer 1934:553, Muma 1951:41; Muma 1970:6 (erroneously synonymized type species of *Eremocosta* with *Eremorhax*).*Eremocosta acuitlapanensis*

(Vázquez & Gavino-Rojas 2000)

Eremopus acuitlapanensis Vázquez & Gavino-Rojas 2000:227.*Eremocosta acuitlapanensis* (Vázquez & Gavino-Rojas): Harvey 2002:451.**Type material.**—Male holotype from Acuitlapan, Guerrero, Mexico (IBUNAM).**Recorded specimens.**—Two males and two females.**Distribution.**—Mexico: Guerrero. Biome: Sonoran Desert.*Eremocosta bajaensis* Muma 1986*Eremorhax bajaensis* Muma 1986:4.*Eremocosta bajaensis* (Muma): Harvey 2002:451.**Type material.**—Male holotype from 3.2 km east of Rancho San Salvador, Baja California, Mexico (CAS). Female allotype from

10.2 km north of Santa Maria, Baja California, Mexico (CAS).

Recorded specimens.—Two males and one female.**Distribution.**—Mexico: Baja California Norte. Biome: Sonoran Desert.*Eremocosta calexicensis* (Muma 1951)*Eremorhax calexicensis* Muma 1951:50.*Eremopus calexicensis* (Muma): Muma 1989:6.*Eremocosta calexicensis* (Muma): Harvey 2002:451.**Type material.**—Male holotype, female allotype and male paratypes from Calexico, California, USA (USNM).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: Arizona, California. Mexico: Baja California Norte. Biome: Sonoran Desert.*Eremocosta formidabilis* (Simon 1879)*Datames formidabilis* Simon 1879:136.*Datames affinis* Kraepelin 1899:242.*Datames* cfr. *formidabilis* (Simon): Banks 1899:378.*Eremobates formidabilis* (Simon): Banks 1900:427.*Eremoperna formidabilis* (Simon): Roewer 1934:561.*Eremorhax formidabilis* (Simon): Muma 1970:4.*Eremopus formidabilis* (Simon): Muma 1989:5.*Eremocosta formidabilis* (Simon): Harvey 2002:451.**Type material.**—*Datames formidabilis*: Male holotype from Guanajuato, Mexico (MNHN). *Datames affinis*: Male holotype and female allotype from Arizona, USA; No. 7297, Roewer No. 9129 (MNHN).**Recorded specimens.**—Three males and a questionable record from Arkansas (probably Arizona).**Distribution.**—USA: Unknown. Mexico: Guanajuato. Biome: Sonoran Desert.*Eremocosta fusca* (Muma 1986)*Eremorhax fuscus* Muma 1986:2.*Eremocosta fusca* (Muma): Harvey 2002:451.**Type material.**—Male holotype from Putla, Oaxaca, Mexico (CAS). Female allotype from 2.4 km N. Cuernavaca, Morelos, Mexico (CAS).**Recorded specimens.**—Known from types only.

Distribution.—Mexico: Morelos, Oaxaca. Biotic community: Sinaloan thornshrub.

Eremocosta gigas Roewer 1934

Eremocosta gigas Roewer 1934:569.

Eremopus gigas (Roewer): Muma 1989:5.

Not *Eremorhax gigas* (Roewer 1934): Muma, 1951 (misidentification, see *Eremocosta gigasellus* (Muma 1951)).

Type material.—Male holotype from Tampico, Mexico (SMF).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Veracruz. Biome: Chihuahuan Desert.

Eremocosta gigasella (Muma 1970)

Eremorhax gigas (Roewer): Muma 1951:48 (misidentification).

Eremorhax gigasellus Muma 1970:8.

Eremopus gigasellus (Muma): Muma & Muma 1988:11.

Eremocosta gigasella (Muma): Harvey 2002:451.

Type material.—Male holotype from Boquillas, Texas, USA (AMNH).

Recorded specimens.—Eight males and three females (DMNH).

Distribution.—USA: New Mexico, Texas and probably Mexico. Biome: Chihuahuan Desert.

Eremocosta montezuma (Roewer 1934)

Eremopus montezuma Roewer 1934:564.

Eremorhax montezuma (Roewer): Muma 1970:6.

Eremocosta montezuma (Roewer): Harvey 2002:451.

Type material.—Male holotype from Orizaba, Mexico (NMWA, No. 8076).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Veracruz. Biome: Chihuahuan Desert.

Eremocosta nigrimana (Pocock 1895)

Gluvia nigrimanus Pocock 1895:94.

Eremobates nigrimanus (Pocock): Kraepelin 1901:128.

Eremorhax magnus (Hancock): Muma 1970:5.

Eremorhax nigrimanus (Pocock): Brookhart & Muma 1987:1.

Eremocosta nigrimana (Pocock): Harvey 2002:451.

Type material.—Male holotype labeled "Probably Meshed, Afghanistan" but the

specimen may be mislabeled (see Muma, 1970:6 and Muma 1976:14) (BMNH, No. 1952).

Recorded specimens.—Known from type only.

Distribution.—Unknown. Biome: Unknown.

Eremocosta robusta (Roewer 1934)

Eremacantha robusta Roewer 1934:571.

Eremorhax robustus (Roewer): Muma 1976:15.

Eremocosta robusta (Roewer): Harvey 2002:451.

Type material.—Immature holotype from Santiago, Mexico (ZMHU, no. 996).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Baja California Norte. Biome: Sonoran Desert.

Eremocosta spinipalpis (Kraepelin 1899)

Datames spinipalpis Kraepelin 1899:243.

Eremobates spinipalpis (Kraepelin): Kraepelin 1901:124.

Eremorhax spinipalpis (Kraepelin): Muma 1970:8.

Eremocosta spinipalpis (Kraepelin): Harvey 2002:451.

Type material.—Female holotype from Santa Rosalia, Mexico (MNHN).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Baja California Sur. Biome: Sonoran Desert.

Eremocosta striata (Putnam 1882)

Datames striatus Putnam 1882:255.

Datames cinerea Putnam 1882:260 (synonymized by Muma 1951:45).

Eremobates cinereus (Putnam): Kraepelin 1901:124.

Eremorhax striatus (Putnam): Muma 1951:45.

Eremopus striatus (Putnam): Muma & Muma 1988:10.

Eremocosta striata (Putnam): Harvey 2002:451.

Type material.—*Datames striatus*: Female holotype from Camp Grant, Arizona, USA (BNHM). *Datames cinerea*: Type locality of male holotype unknown (ANS).

Recorded specimens.—Several males and females.

Distribution.—USA: Arizona, California. Mexico: Sonora. Biome: Sonoran Desert.

Eremocosta titania Muma 1951*Eremocosta titania* Muma 1951:48.*Eremopus titania* (Muma): Muma & Muma 1988: 11.*Eremocosta titania* Muma: Harvey 2002:451.

Type material.—Male holotype and 2 male paratypes from Twenty-nine Palms, California, USA (AMNH). Female allotype from 12 km northwest of Las Vegas, Nevada, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: California and Nevada. Biome: Sonoran Desert; Mojave Desert.

Genus *Eremothera* Muma 1951*Eremothera* Muma 1951:82.*Eremothera drachmani* Muma 1986*Eremothera drachmani* Muma 1986:10.

Type material.—Male holotype from Nueva Guymas, Sonora, Mexico (AMNH).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Sonora. Biome: Sonoran Desert.

Eremothera sculpturata Muma 1951*Eremothera sculpturata* Muma 1951:82

Type material.—Male holotype from Arizona, USA, no further locality data (AMNH).

Recorded specimens.—Known from type and 3 males.

Distribution.—USA: Arizona. Mexico: Sonora. Biome: Sonoran Desert.

Genus *Eremobates* Banks 1900*Datames* Simon 1879:133.*Eremobates* Banks 1900:426 (in part).*Eremoperna* Roewer 1934:557 (in part).*Eremopus* Roewer 1934:561 (in part).*Eremocosta* Roewer 1934:561 (in part).*Eremospina* Roewer 1934:565.*Eremognatha* Roewer 1934:569 (in part).*Eremoseta* Roewer 1934:569 (in part).*Eremostata* Roewer 1934:571 (in part).***Eremobates angustus* group***Eremobates angustus* Muma 1951*Eremobates angustus* Muma 1951:80.

Type material.—Male holotype, female allotype, and male paratype from Madera Can-

yon, Santa Rita Mountains, Arizona, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Arizona and Texas. Biome: Interdesert Grassland; Sonoran Desert.

Eremobates becki Muma 1986*Eremobates becki* Muma 1986:7.

Type material.—Male holotype from Colonia Garcia, Chihuahua, Mexico (BYU).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Chihuahua. Biome: Chihuahuan Desert.

Eremobates cruzi Muma 1951*Eremobates cruzi* Muma 1951:82.

Type material.—Male holotype from Bear Valley, Santa Cruz County, Arizona, USA (MCZ).

Recorded specimens.—Three males.

Distribution.—USA: Arizona. Biome: Interdesert Grassland; Sonoran Desert.

Eremobates aztecus* groupEremobates aztecus* Pocock 1902*Eremobates aztecus* Pocock 1902:60.

Type material.—Male holotype and female allotype from Guanajuato, Mexico (BMNH).

Recorded specimens.—Two males and females.

Distribution.—Mexico: Guanajuato. Biotic community: Sinaloan Thornscrub.

Eremobates lapazi* groupEremobates lapazi* Muma 1986*Eremobates lapazi* Muma 1986:9.

Type material.—Male holotype and female allotype from 16.2 km NW of La Paz, Baja California, Mexico (CAS).

Recorded specimens.—Two males and one female.

Distribution.—Mexico: Baja California Sur. Biome: Sonoran Desert.

Eremobates pallipes* groupEremobates arizonicus* (Roewer 1934)*Eremostata arizonica* Roewer 1934:574.*Eremobates pallipes* (Say): Muma 1951:73.

Eremobates arizonicus (Roewer): Brookhart & Muma 1981:295.

Type material.—Female holotype from Arizona, USA (ZSM). Male “allotype” from Hurley, New Mexico, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: New Mexico and Arizona. Biome: Interdesert Grassland.

Eremobates barberi (Muma 1951)

Eremothera barberi Muma 1951:83.

Eremobates californicus (Simon): Muma 1951:76 (in part: some males); not *Datames californicus* (Simon 1879).

Eremobates simoni Muma 1970:25 (in part: some males).

Eremobates barberi (Muma): Brookhart & Muma 1981:302.

Type material.—Female holotype from Brownsville, Texas, USA (USNM). Male allotype from Sanderson, Texas, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Texas. Biome: Chihuahuan Desert.

Eremobates californicus (Simon 1879)

Datames californicus Simon 1879:143.

Eremopus californicus (Simon): Roewer 1934:565.

Eremostata californica (Simon): Roewer 1934:574.

Not *Eremobates californicus* (Simon): Muma 1951:76 (misidentification, *Eremobates simoni* Muma 1970).

Type material.—Holotype from Mariposa, California, USA is immature and cannot be properly placed (MNHN, No. 1516).

Distribution.—USA: California. Biome: Sonoran Desert.

Eremobates chihuaensis
Brookhart & Cushing 2002

Eremobates chihuaensis Brookhart & Cushing 2002:87.

Type material.—Male holotype and male paratype from southeast of Chihuahua, Mexico (DMNH).

Recorded specimens.—Known from male holotype and paratype only.

Distribution.—Mexico: Chihuahua. Biome: Chihuahuan Desert.

Eremobates cinerascens (C.L. Koch 1842)

Gluvia cinerascens C.L. Koch 1842:355.

Datames cinerascens (C.L. Koch): Simon 1879:144.

Eremobates cinerascens (C.L. Koch): Kraepelin 1901:122.

Eremostata cinerascens (C.L. Koch): Roewer 1934:573.

Type material.—Male holotype from Mexico, locality unknown (MNHN, No. 9139).

Recorded specimens.—One male.

Distribution.—Mexico. Biome: unknown.

Eremobates dentilis
Brookhart & Muma 1981

Eremobates dentilis Brookhart & Muma 1981:295.

Type material.—Male holotype from unknown location (AMNH).

Recorded specimens.—One male.

Distribution.—Unknown, probably Baja California, Mexico. Biome: Sonoran Desert.

Eremobates dilatatus (Putnam 1882)

Datames dilatata Putnam 1882:259.

Eremobates dilatatus (Putnam): Muma 1951:78.

Type material.—Female holotype with no locality data (ANS).

Recorded specimens.—One female.

Distribution.—Probably Baja California, Mexico. Biome: Sonoran Desert.

Eremobates dinamita (Roewer 1934)

Eremostata dinamita Roewer 1934:574.

Eremobates dinamita (Roewer): Brookhart and Muma 1981:292.

Type material.—Female holotype (labeled *Eremogyna dinamita*) from Dinamita, Durango, Mexico (MNHN, No. 8389). Muma (1970) synonymized this species with *E. pallipes*.

Recorded specimens.—One female.

Distribution.—Mexico: Durango. Biome: Sonoran Desert.

Eremobates docolora
Brookhart & Muma 1981

Eremobates docolora Brookhart & Muma 1981:292.

Type material.—Male holotype from Craig, Colorado, USA (AMNH). Female allotype from southwest of Encampment, Wyoming, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Colorado, Montana, Wyoming and North Dakota. Canada: Alberta, British Columbia, Saskatchewan. Biome: Cold Dry Grassland.

Eremobates durangonus Roewer 1934

Eremobates durangonus Roewer 1934:557.

Type material.—Two female syntypes from Durango, Mexico cannot be located and must be presumed lost (Muma 1970). Brookhart and Muma (1981) did not designate a neotype because there is no specimen from type locality.

Recorded specimens.—Numerous males and females.

Distribution.—USA: Arizona, California; Mexico. Biome: Sonoran Desert.

Eremobates formicarius (C.L. Koch 1842)

Gluvia formicaria C.L. Koch 1842:356.

Datames formicarius (C.L. Koch): Simon 1879: 144.

Eremobates formicaria (C.L. Koch): Banks 1900: 426.

Datames formicaria (C.L. Koch): Barrows 1925: 495.

Eremopus formicarius (C.L. Koch): Roewer 1934: 565.

Type material.—Male lectotype from Puebla (Pueblo?), Mexico (ZMHU, No. 8335). Muma synonymized this species with *E. pallipes*.

Recorded specimens.—One male.

Distribution.—Mexico: Unknown. Biotic community: Sinaloan Thornscrub.

Eremobates gerbae

Brookhart & Cushing 2002

Eremobates gerbae Brookhart & Cushing 2002:85.

Type material.—Male holotype, female allotype, and 2 males and 1 female paratype from Mack Burn Area, Rincon Mountains, Pima County, Arizona, USA (DMNH).

Recorded specimens.—Known from types, paratypes, and three males.

Distribution.—USA: Arizona. Biome: Sonoran Desert.

Eremobates lentiginosus (Kraepelin 1899)

Datames lentiginosus Kraepelin 1899:244.

Eremobates lentiginosus (Kraepelin): Kraepelin 1901:124.

Type material.—Female holotype with no locality data (Museum of Turin, Italy).

Recorded specimens.—Only known from female holotype.

Distribution.—Unknown. Biome: Unknown.

Eremobates pallipes (Say 1823)

Galeodes pallipes Say 1823:3.

Galeodes subulata Say 1823:3.

Gluvia cinerascens (Say): C.L. Koch 1842:350.

Datames pallipes (Say): Simon 1879:139.

Datames subulata (Say): Putnam 1883:267.

Eremobates pallipes (Say): Banks 1900:427.

Eremobates pallipes (Say): Fichter 1940:325.

Eremobates subulata (Say): Muma 1970:28.

Type material.—*Galeodes pallipes*: Location of the female type from Denver, Colorado, USA is unknown. Fichter (1940) established the identity of the species but did not select a neotype. Say's specimens cannot be located in North American (Muma, 1951) or European (Muma 1970) type depositories and are presumed lost. Brookhart and Muma (1981) designated a male neotype from Highway 205c, Byers, Colorado, USA and a female "allotype" from Castle Rock, Colorado, USA (AMNH). *Galeodes subulata*: The type is lost or destroyed (Muma 1951).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Colorado, Nebraska, South Dakota, Wyoming, New Mexico, Oklahoma, Texas. Biome: Chihuahuan Desert; High Dry Grassland.

Eremobates putnami (Banks 1898)

Datames putnami Banks 1898:2.

Eremobates putnami (Banks): Banks 1900:427.

Type material.—Male and young female syntypes from San Jose del Cabo, Mexico (MCZ).

Recorded specimens.—Known from types only.

Distribution.—Mexico: Baja California Sur. Biome: Sonoran Desert.

Eremobates simoni Muma 1970

Eremobates californicus (Simon 1879): Muma

1951:76 (not *Datames californicus* Simon 1879).

Eremobates simoni Muma 1970:25.

Type material.—Male holotype from Gillespie County, Texas, USA (AMNH). Female

allotype from Wichita County, Texas, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: New Mexico and Texas. Biome: Chihuahuan Desert.

Eremobates suspectus Muma 1951

Eremobates suspectus Muma 1951:79.

Type material.—Male holotype and female allotype from White River, Arizona, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Arizona. Biome: Interdesert Grassland.

Eremobates woodruffi
Brookhart & Muma 1981

Eremobates woodruffi Brookhart & Muma 1981: 302.

Type material.—Male holotype from Pulgum Mountain, in Big Bend National Park, Texas, USA (AMNH).

Recorded specimens.—Three males.

Distribution.—USA: Texas and probably Mexico. Biome: Chihuahuan Desert.

Eremobates palpisetulosus group

Eremobates affinis (Kraepelin 1899)

Datames affinis Kraepelin 1899:242.

Eremobates affinis (Kraepelin): Kraepelin 1901: 128.

Eremoperna affinis (Kraepelin): Roewer 1934:561.

Eremobates affinis (Kraepelin): Muma & Brookhart 1988:22.

Not *Eremobates affinis* (Kraepelin), Muma 1951:65 (misidentification).

Type material.—Male and female syntypes from Arizona, USA, no locality. No. 7297, Roewer No. 9129 (ZSM). These specimens agree with Kraepelin's (1899) description and are therefore the types of the species. Muma's (1970) type designation for *E. affinis* in MNHN are not the types.

Recorded specimens.—Several males and females.

Distribution.—USA: Arizona. Interdesert Grassland; Chihuahuan Desert.

Eremobates ajoanus
Muma & Brookhart 1988

Eremobates ajoanus Muma & Brookhart 1988:19.

Type material.—Male holotype from south

of Ajo, Arizona, USA (FSCA). Female allotype from north of Organ Pipe National Monument, Arizona, USA (FSCA).

Recorded specimens.—Eight males and seven females.

Distribution.—USA: Southwestern Arizona. Biome: Sonoran Desert.

Eremobates bajadae
Muma & Brookhart 1988

Eremobates bajadae Muma & Brookhart, 1988:12.

Type material.—Male holotype and female allotype from Deming, New Mexico, USA (FSCA).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Southern New Mexico and eastern Arizona. Biome: Interdesert Grassland.

Eremobates bajaensis Muma 1986

Eremobates bajaensis Muma 1986:5.

Type material.—Male holotype from Baja California Norte, Mexico.(CAS). Male paratype from Socorro Sand Dunes, Baja California Norte, Mexico (AMNH).

Recorded specimens.—Two males.

Distribution.—Mexico: Baja California Norte. Biome: Sonoran Desert.

Eremobates bantai Brookhart 1965

Eremobates bantai Brookhart 1965:153.

Type material.—Male holotype and female allotype from Fremont County, Colorado, USA (AMNH).

Recorded specimens.—Eight males and six females.

Distribution.—USA: South central Colorado. Biome: High Dry Grassland.

Eremobates bixleri Muma & Brookhart 1988

Eremobates bixleri Muma & Brookhart 1988:21.

Type material.—Male holotype from Pima County, Tucson, Arizona, USA (FSCA).

Recorded specimens.—Females known from a single badly fragmented, previously dehydrated specimen from Tucson, Arizona, USA. Four males and one female.

Distribution.—USA: Southern Arizona, probably Mexico. Biome: Sonoran Desert.

Eremobates coahuilanus Muma 1986*Eremobates coahuilanus* Muma 1986:6.

Type material.—Male holotype from southwest of Cuatro Ciénegas, Coahuila, Mexico (CAS). Male paratype from southeast of Rancho Orazco, Cuatro Ciénegas Basin, Coahuila, Mexico (CAS).

Recorded specimens.—Two males.

Distribution.—Mexico: Coahuila. Biome: Chihuahuan Desert.

Eremobates fagei (Roewer 1934)*Eremopus fagei* Roewer 1934:563.

Eremobates purpusi (Roewer): Muma 1951:70 (in part, males and females from Fresno and San Benito Counties, California, USA).

Eremobates villosus Muma 1970:21 (in part, males and females from Fresno and San Benito Counties, California, USA).

Eremobates fagei (Roewer): Muma 1970:16.

Type material.—Female holotype from California, USA (MNHN, Roewer No. 9134). Muma's (1951) records of *E. villosus*, under *E. purpusi*, from Pacific Grove and San Benito County may be this species.

Recorded specimens.—Several males and four females.

Distribution.—USA: California. Biotic community: California Steppe.

Eremobates girardi (Putnam 1883)*Datames girardii* Putnam 1883:257.*Eremobates girardi* (Putnam): Kraepelin 1901:128.

Type material.—Male holotype from Arkansas, USA (see below) was supposed to be in ANS, but has been either lost or destroyed. Not in museum in Davenport, Iowa, hometown of J.D. Putnam and J.O. Brookhart.

Recorded specimens.—Two males.

Distribution.—State of Arkansas was cited by Putnam but this is obviously in error. We have seen two males from the Sonoran region of Mexico, so Arizona would be likely location. Biome: Sonoran Desert.

Eremobates gracilidens Muma 1951*Eremobates gracilidens* Muma 1951:66.

Type material.—Male holotype from Twenty-nine Palms, California, USA. Female allotype from Lone Pine, Inyo County, California, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Arizona and California. Biome: Mojave Desert.

Eremobates guenini (Roewer 1934)*Eremognatha guenini* Roewer 1934:567.*Eremobates guenini* (Roewer): Muma 1970:17.

Type material.—Male holotype from Dinamita, Mexico (MNHN. No. 8390).

Recorded specimens.—Twelve males.

Distribution.—Mexico: Durango. Biome: Sonoran Desert.

Eremobates hessei (Roewer 1934)*Eremopus hessei* Roewer 1934:567.

Eremobates hessei (Roewer): Muma 1970:18 (misidentification; see Muma 1988:8). Muma (1970) synonymized *Eremobates nodularis* Muma 1951 with *E. hessei* (Roewer 1934) and Muma & Brookhart in 1988 synonymized *E. hessei* with *E. nodularis*.

Type material.—Female holotype from Distrito Federal, Mexico (ZMHU No. 7972).

Recorded specimens.—Known only from holotype.

Distribution.—Mexico: Distrito Federal. Biome: Chihuahuan Desert.

Eremobates hystrix (Mello-Leitão 1942)*Eremoperna hystrix* Mello-Leitão 1942:307.*Eremobates hystrix* (Mello-Leitão): Muma 1970:28.

Type material.—Male holotype from Distrito Federal, Mexico (MNRJ).

Recorded specimens.—Known from holotype only.

Distribution.—Mexico: Distrito Federal. Biotic community: Sinaloan Thornscrub.

Eremobates inyoanus
Muma & Brookhart 1988*Eremobates inyoanus* Muma & Brookhart 1988:43.

Type material.—Female holotype from Saline Valley, Inyo County, California, USA (CAS).

Recorded specimens.—Four females.

Distribution.—USA: California. Biome: Sonoran Desert.

Eremobates kastoni
Muma & Brookhart 1988*Eremobates kastoni* Muma & Brookhart 1988:39.

Type material.—Male holotype and fe-

male allotype from San Diego, California, USA (FSCA).

Recorded specimens.—Several males and females.

Distribution.—USA: California. Biotic community: California Chaparral.

Eremobates kiseri Muma & Brookhart 1988

Eremobates kiseri Muma & Brookhart 1988:15.

Type material.—Male holotype from Turkey, Texas, USA (FSCA). Female allotype from southeast of Turkey, Texas, USA (FSCA).

Recorded specimens.—Several males and females.

Distribution.—USA: Texas. Biome: Chihuahuan Desert.

Eremobates kraepelini Muma 1951

Eremobates mormonus (Roewer): Muma 1951:67 (misidentification).

Eremobates kraepelini Muma 1970:18.

Type material.—Male holotype from Dry Canyon, southeast of Monterey, California, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Arizona, California, Nevada. Biotic community: California Grasslands.

Eremobates leechi Muma & Brookhart 1988

Eremobates leechi Muma & Brookhart 1988:35.

Type material.—Male holotype from 44.8 km south of Livermore, Santa Clara County, California (CAS).

Recorded specimens.—Known from type only.

Distribution.—USA: Northern California. Biotic community: California Grasslands.

Eremobates marathoni Muma 1951

Eremobates marathoni Muma 1951:63; Muma 1988:13 (description of female).

Type material.—Male holotype from Marathon, Texas, USA (AMNH). Female allotype from 9.6 km south of Nuevo Laredo, Mexico (AMNH).

Recorded specimens.—Several males and females.

Distribution.—USA: Southern Texas.

Mexico: Chihuahua. Biome: Chihuahuan Desert.

Eremobates nanus Muma 1962

Eremobates nanus Muma 1962:4.

Type material.—Male holotype from Riverton, Eldorado County, California, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: northeastern California. Biome: Mojave Desert.

Eremobates nivis Muma & Brookhart 1988

Eremobates nivis Muma & Brookhart 1988:34.

Type material.—Male holotype from Snowline Camp, Eldorado County, California (CAS).

Recorded specimens.—Known from type only.

Distribution.—USA: Northern California. Biome: Mojave Desert.

Eremobates nodularis Muma 1951

Eremobates nodularis Muma 1951:69 (male); Muma 1963:6 (female).

Eremobates hessei (Roewer): Muma 1970:18 (misidentification).

Type material.—Male holotype from Carlsbad, New Mexico, USA (AMNH). Female allotype from Portal, Cochise County, Arizona, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: southwestern Texas, southern Arizona, southern California and New Mexico. Mexico: Unknown. Biome: Chihuahuan Desert; Interdesert Grassland; Sonoran Desert.

Eremobates norrisi

Muma & Brookhart 1988

Eremobates norrisi Muma & Brookhart 1988:14.

Type material.—Male holotype and female allotype north of Silver City, New Mexico, USA (FSCA).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Southwestern Texas, Southern New Mexico. Biome: Chihuahuan Desert; Interdesert Grassland.

Eremobates otavonae Muma & Brookhart*Eremobates otavonae* Muma & Brookhart 1988:29.**Type material.**—Male holotype, male paratype and female allotype from Novato, Marin County, California, USA (CAS).**Recorded specimens.**—Four males and one female.**Distribution.**—USA: Marin and Napa Counties in North central California. Biotic community: California Grassland.*Eremobates pallidus* Muma & Brookhart*Eremobates pallidus* Muma & Brookhart 1988:25.**Type material.**—Male holotype near Pear Blossom, San Bernadino County, California, USA (AMNH). Female allotype from Deep Canyon, Riverside County, California (UCR).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: California, Nevada, Utah. Biome: Sonoran Desert; Mojave Desert.*Eremobates palpisetulosus* Fichter 1941*Eremobates palpisetulosus* Fichter 1941:179; Muma 1951:61.**Type material.**—Male cotypes (syntypes) from Sidney, Nebraska, USA and Harrisburg, Nebraska, USA (AMNH).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: Nebraska, Colorado, Kansas, Oklahoma, New Mexico, Northern Texas. Biome: High Dry Grassland.*Eremobates papillatus* Muma 1970*Eremobates tuberculatus* (Kraepelin): Muma 1951:72 (misidentification).*Eremobates papillatus* Muma 1970:20.**Type material.**—Male holotype from Mount Palomar State Park, San Diego County, California, USA (AMNH).**Recorded specimens.**—One male and three females.**Distribution.**—USA: San Diego County, Mexico: Baja California Norte. Biome: Sonoran Desert; California Sagebrush.*Eremobates pimanus*
Muma & Brookhart 1988*Eremobates pimanus* Muma & Brookhart 1988:23.**Type material.**—Male holotype from Or-

gan Pipe Cactus National Monument, Pima County, Arizona, USA (AMNH).

Recorded specimens.—Known from type only.**Distribution.**—USA: Southwestern Arizona. Biome: Sonoran Desert.*Eremobates polhemusi*
Muma & Brookhart 1988*Eremobates polhemusi* Muma & Brookhart 1988:18.**Type material.**—Male holotype from Mesa, Grand Flat, near Hall's Crossing, San Juan County, Utah, USA (AMNH).**Recorded specimens.**—Three males, three females collected 4 miles north of Bluff, San Juan County, Utah, USA (DMNH).**Distribution.**—USA: Extreme Southeastern Utah. Biome: Interdesert Grassland.*Eremobates purpusi* (Roewer 1934)*Eremopus purpusi* Roewer 1934:561.*Eremobates purpusi* (Roewer): Muma 1970:21 (misidentification, see *Eremobates scopulatus* Muma & Brookhart).**Type material.**—Female holotype from Tlaquiloxepec, Mexico, No. 8332 (ZMHU).**Recorded specimens.**—Numerous collections of both sexes.**Distribution.**—USA, California, Nevada, New Mexico, Utah. Mexico: Coahuila. Biome: Chihuahuan Desert; Mojave Desert; Sonoran Desert; Interdesert Grassland.*Eremobates pyriflora*
Muma & Brookhart 1988*Eremobates pyriflora* Muma & Brookhart 1988:27.**Type material.**—Male holotype from Pear Blossom, San Bernardino County, California, USA (FSCA).**Recorded specimens.**—Known from type only.**Distribution.**—USA: San Bernadino County, California. Biome: Sonoran Desert.*Eremobates scopulatellus*
Muma & Brookhart 1988*Eremobates scopulatellus* Muma & Brookhart 1988:40.**Type material.**—Male holotype and female allotype from Winchester, Riverside County, California, USA (FSCA).

Recorded specimens.—Numerous males and females.

Distribution.—USA: South central California. Biome: Sonoran Desert.

Eremobates scopulatus Muma 1951

Eremobates scopulatus Muma 1951:67.

Eremobates purpusi (Roewer): Muma 1951:70 (misidentification).

Type material.—Male holotype from Las Vegas, New Mexico, USA (probably Las Vegas, Nevada since all other records are from Utah, Nevada and California). Female allotype from Las Vegas, Nevada, USA (AMNH).

Recorded specimens.—Several males and females.

Distribution.—USA: Nevada, California, Utah. Biome: Mojave Desert.

Eremobates spissus
Muma & Brookhart 1988

Eremobates spissus Muma & Brookhart 1988:37.

Type material.—Male holotype from Frank Raines County Park, Stanislaus County, California, USA (CAS). Female allotype and 1 female paratype from west of Westley, Stanislaus County, California, USA (FSCA).

Recorded specimens.—Three males and two females.

Distribution.—USA: California. Biotic community: California Chaparral.

Eremobates tejonus Chamberlin 1925

Eremobates tejonus Chamberlin 1925:236, Muma 1951:70.

Type material.—Male holotype from stomach of *Bufo* sp. from Ft. Tejon, California, USA (MCZ).

Recorded specimens.—Known from type only.

Distribution.—USA: Central California. Biotic community: California Chapparal.

Eremobates texanus
Muma & Brookhart 1988

Eremobates texanus Muma & Brookhart 1988:16.

Type material.—Male holotype and female allotype from east of Van Horn, Texas, USA (FSCA).

Recorded specimens.—Six males and six females.

Distribution.—USA: Texas. Biome: Chihuahuan Desert.

Eremobates titschacki (Roewer 1934)

Eremoseta titschacki Roewer 1934:569.

Eremobates affinis (Kraepelin): Muma 1951:65 (misidentification).

Eremobates titschacki (Roewer): Muma 1970:21 (male).

Type material.—Male holotype from California, USA without specific locality (ZSM, Roewer No. 8485).

Recorded specimens.—Several males and females.

Distribution.—USA: Central to northern California. Biotic community: California Steppe.

Eremobates tuberculatus (Kraepelin 1899)

Datames tuberculatus Kraepelin 1899:241 (male).

Eremobates tuberculatus (Kraepelin): Kraepelin 1901:122 (not *Eremobates tuberculatus* (Kraepelin) *sensu* Muma 1951:72).

Eremognatha tuberculata (Kraepelin): Roewer 1934:567 (male).

Eremobates tuberculatus (Kraepelin): Muma 1970:21 (male).

Type material.—Male holotype from California, USA (ZSM No. 2839, Roewer No. 8374).

Recorded specimens.—Known from type only.

Distribution.—USA: California. Biome: Unknown (lack of type locality).

Eremobates vicinus Muma 1963

Eremobates vicinus Muma 1963:3.

Type material.—Male holotype from Mercury, Nye County, Nevada, USA (AMNH).

Recorded specimens.—Several males and females.

Distribution.—USA: Nevada and California. Biome: Mojave Desert.

Eremobates villosus Muma 1951

Eremobates purpusi (Roewer): Muma 1951:70 (misidentification).

Eremobates villosus Muma 1970:21.

Type material.—Male holotype and female allotype from Point McCloud Campground, Shasta Lake, Shasta County, California, USA (AMNH).

Recorded specimens.—Several males and females.

Distribution.—USA: California. Biotic community: California Steppe.

Eremobates williamsi
Muma & Brookhart 1988

Eremobates williamsi Muma & Brookhart 1988:33.

Type material.—Male holotype and female allotype from Wildcat Canyon, San Diego County, California, USA (CAS). Male paratype from San Diego area, San Diego County, California, USA (CAS).

Recorded specimens.—Three males and two females.

Distribution.—USA: Southern California. Biotic community: California Sagebrush.

***Eremobates scaber* group**

Eremobates actenidia Muma 1989

Eremobates actenidia Muma 1989:9.

Type material.—Male holotype from Gouldings Trading Post, Monument Valley, San Juan County, Utah, USA (FSCA).

Recorded specimens.—Four males and four females (DMNH).

Distribution.—USA: San Juan County, Utah. Biome: Great Basin Desert.

Eremobates clarus Muma 1989

Eremobates clarus Muma 1989:10.

Type material.—Male holotype from Saratoga Stratton Exp. Watershed, Carbon County, Wyoming, USA (FSCA).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Southwestern Wyoming, Northwestern Colorado. Biome: Cold High Grassland.

Eremobates corpink
Brookhart & Cushing 2004

Eremobates corpink Brookhart & Cushing 2004:306.

Type material.—Male holotype and female allotype from Coral Pink Sand Dunes, Kane County, Utah, USA (DMNH).

Recorded specimens.—Three males and two females.

Distribution.—USA: Southern Utah. Biome: Great Basin Desert.

Eremobates ctenidiellus Muma 1951

Eremobates ctenidiellus Muma 1951:57.

Type material.—Male holotype and female allotype from Glenwood, Sevier County, Utah, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Colorado and Utah. Biome: Great Basin Desert.

Eremobates hodai Muma 1989

Eremobates hodai Muma 1989:13.

Type material.—Male holotype, with type locality unknown (probably Idaho, USA) (FSCA).

Recorded specimens.—Several males and females.

Distribution.—USA: Snake River Valley, Idaho. Biome: Cold Dry Grassland.

Eremobates icenogelei
Brookhart & Cushing 2004

Eremobates icenogelei Brookhart & Cushing 2004:300.

Type material.—Male holotype, female allotype, and 5 male and 5 female paratypes from Winchester, San Bernadino County, California, USA (DMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Southeastern California. Biome: Sonoran Desert.

Eremobates legalis Harvey 2002

Datames geniculatus (C.L. Koch): Simon 1879:138–139, fig. 31 (misidentification).

“*Eremocosta geniculata* (Simon)”: Roewer 1934:570, fig. 324 (misidentification).

“*Eremobates geniculatus* (Simon)”: Muma 1970:10–11; Muma 1987:20 (misidentifications).

Eremobates legalis Harvey 2002:451.

Not “*Eremobates geniculatus* (Simon)”: Muma 55, figs. 54–57 (misidentification, see *Eremobates mormonus* (Roewer)).

Type material.—Female holotype without precise locality from Mexico (MNHN 2129, Roewer No. 9135).

Recorded specimens.—Known from type only.

Distribution.—Mexico. Biome: Unknown.

Eremobates mormonus (Roewer 1934)*Eremoperna mormona* Roewer 1934:561.*Eremobates geniculatus* (Simon): sensu Muma 1951:55.*Eremobates mimbrenus* Muma 1989:12.*Eremobates mormonus* (Roewer): Muma 1963:1.

Type material.—*Eremoperna mormona*: Female holotype from Utah, USA (SMF, No. RII/3466). *Eremobates mimbrenus*: Male and female syntypes from Grant County, New Mexico, USA (FSCA).

Recorded specimens.—Several males and females.

Distribution.—USA: Utah, Arizona. Biome: Interdesert Grassland.

Eremobates scaber (Kraepelin 1899)*Datames scaber* Kraepelin 1899:243.*Eremobates scaber* (Kraepelin): Kraepelin 1901:124.*Eremostata scabra* (Kraepelin): Roewer 1934:124.*Eremobates septentrionis* Muma 1951:52.*Eremobates gladiolus* Muma 1951:57.*Eremobates scaber* (Kraepelin): Brookhart & Cushing 2004:288.

Type material.—*Datames scaber*: Female holotype from "Washington Territory", USA (MNHN, No. 9137). *Eremobates septentrionis*: Male holotype from East Branch, Salt Lake City, Utah, USA (AMNH). *Eremobates gladiolus*: Male holotype from Maupin, Oregon, USA (AMNH). Female allotype from Starbuck, Washington, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Oregon, Washington; Canada: British Columbia. Biome: Cold Dry Grassland.

Eremobates similis Muma 1951*Eremobates similis* Muma 1951:60.

Type material.—Male holotype from Elk Ridge, Utah, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—Rio Grande Valley of Colorado and New Mexico, USA. Biome: Chihuahuan Desert; High Dry Grassland.

Eremobates socal

Brookhart & Cushing 2004

Eremobates socal Brookhart & Cushing 2004:304.

Type material.—Male holotype, female al-

lotype from Mt. Palomour, San Bernadino County, California, USA (AMNH).

Recorded specimens.—Three males and four females.

Distribution.—USA: San Bernadino County, California. Biotic community: California Sagebrush.

Eremobates zinni Muma 1951*Eremobates zinni* Muma 1951:558.

Type material.—Male holotype and female allotype from Las Vegas, Nevada, USA (AMNH).

Recorded specimens.—Five males and two females.

Distribution.—USA: California, Nevada, Utah. Biome: Mojave Desert.

Genus *Horribates* Muma 1962*Horribates* Muma 1962:7.*Horribates bantai* Muma*Horribates bantai* Muma 1989:17.

Type material.—Female holotype from Saline Valley-Station 18, Inyo County, California, USA (CAS).

Recorded specimens.—Known from type only.

Distribution.—USA: Southern California. Biotic community: California Sagebrush.

Horribates minimus Muma 1989*Horribates minimus* Muma 1989:16.

Type material.—Female holotype from Lytle Creek Canyon, San Bernadino County, California, USA (FSCA).

Recorded specimens.—Known from type only.

Distribution.—USA: Southern California. Biotic community: California Sagebrush.

Horribates spinigerus Muma 1962*Horribates spinigerus* Muma 1962:7.

Type material.—Female holotype from Borrego State Park, San Diego, California, USA (AMNH).

Recorded specimens.—Two females.

Distribution.—USA: California, Nevada. Biotic community: California Sagebrush.

Subfamily Therobatinae Muma 1951

Therobatinae Muma 1951:85.

Genus *Chanbria* Muma 1951*Chanbria rectus* Muma 1962*Chanbria rectus* Muma 1962:30.**Type material.**—Male holotype from Barstow, San Bernadino County, California, USA (AMNH).**Recorded specimens.**—Known from type only.**Distribution.**—USA: Southern California. Biome: Sonoran Desert.*Chanbria regalis* Muma 1951*Chanbria regalis* Muma 1951:96.**Type material.**—Male holotype and 1 male paratype from Twenty-nine Palms, California, USA Female allotype from Palm Springs, California, USA (AMNH).**Recorded specimens.**—Several males and females.**Distribution.**—USA: Southern California. Biome: Sonoran Desert; Sand Dunes.*Chanbria serpentinus* Muma 1951*Chanbria serpentinus* Muma 1951:98.**Type material.**—Male holotype from Tucson, Arizona, USA (AMNH).**Recorded specimens.**—Four males.**Distribution.**—USA: Arizona. Biome: Sonoran Desert; Sand Dunes.*Chanbria tehachapianus* Muma 1962*Chanbria tehachapianus* Muma 1962:29.**Type material.**—Male holotype from Tehachapi Mountains, Kern County, California, USA (AMNH).**Recorded specimens.**—Known from holotype only.**Distribution.**—USA: California. Biotic community: California Steppe; Sand Dunes.**Genus *Eremochelis* Roewer 1934***Eremochelis* Roewer 1934:570.*Therobates* Muma 1951:85 (synonymized by Muma 1970:30).***Eremochelis andreasana* group***Eremochelis andreasana* (Muma 1962)*Therobates andreasana* Muma 1962:18.*Eremochelis andreasana* (Muma): Muma 1970:35.**Type material.**—Male holotype and fe-

male allotype from Andreas Canyon, Riverside, California, USA (AMNH).

Recorded specimens.—Numerous specimens of both sexes.**Distribution.**—USA: California. Mexico: Baja California Norte. Biotic community: California Sagebrush, Sonoran Desert.*Eremochelis sonorae* Muma 1987*Eremochelis sonorae* Muma 1987:13.**Type material.**—Male holotype and female allotype from San Carlos Bay, Sonora, Mexico (CAS).**Recorded specimens.**—Known from types only.**Distribution.**—Mexico: Sonora. Biome: Sonoran Desert.***Eremochelis branchi* group***Eremochelis bechteli* Muma 1988*Eremochelis bechteli* Muma 1988:23.**Type material.**—Male holotype from Whiskey Flat, Mineral County, Nevada, USA (FSCA).**Recorded specimens.**—Known from type only.**Distribution.**—USA: Nevada. Biome: Great Basin Desert.*Eremochelis bidepressus* (Muma 1951)*Hemerotrecha bidepressa* Muma 1951:105.*Therobates arcellus* Muma 1962:13 (male, not female).*Therobates bidepressus* (Muma): Muma 1963:6.*Eremochelis bidepressus* (Muma): Muma 1970:30.**Type material.**—*Hemerotrecha bidepressa*: Female holotype and 1 female paratype from Reno, Nevada, USA (AMNH). Male allotype from Mercury, Nevada, USA (AMNH). *Therobates arcellus*: Male holotype, female allotype and 1 female paratype from Mercury, Nevada, USA (AMNH).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: Nevada, Idaho, Washington, Utah. Biome: Mojave Desert; Great Basin Desert.*Eremochelis branchi* (Muma 1951)*Therobates branchi* Muma 1951:85.*Eremochelis branchi* (Muma): Muma 1970:20.**Type material.**—Male holotype from

Twenty-nine Palms, California, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Southern California, Arizona, Nevada. Biome: Sonoran Desert; Mojave Desert; Great Basin Desert.

Eremochelis coloradensis (Muma 1962)

Therobates coloradensis Muma 1962:9.

Eremochelis coloradensis (Muma): Muma 1970:31.

Type material.—Female holotype from Grand Canyon, Arizona, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Arizona. Biome: Interdesert Grassland.

Eremochelis flavus Muma 1989

Eremochelis flavus Muma 1989:85.

Type material.—Female holotype from Winterhaven, California, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Southern California. Biome: Sonoran Desert

Eremochelis fuscillus Muma 1989

Eremochelis fuscillus Muma 1989:22.

Type material.—Male holotype, female allotype and 1 male paratype from Newberry, San Bernadino County, California, USA (FSCA).

Recorded specimens.—Known from types only.

Distribution.—USA: Southern California. Biome: Sonoran Desert.

Eremochelis gertschi (Muma 1951)

Therobates gertschi Muma 1951:86.

Eremochelis gertschi (Muma): Muma 1970:31.

Type material.—Female holotype from Zion National Park, Utah, USA (AMNH).

Recorded specimens.—Six males and females.

Distribution.—USA: Utah. Biome: Great Basin Desert.

Eremochelis insignatus Roewer 1934

Eremochelis insignatus Roewer 1934:570.

Therobates cameronensis Muma 1951:90 (synonymized by Muma 1970:31).

Hemerotrecha insignita (Roewer): Muma 1951:108.

Therobates arcellus Muma 1962:13 (misidentification, females only).

Eremochelis arcellus (Muma): Muma 1976:18.

Eremochelis cameronensis (Muma): Muma 1976:19.

Eremochelis insignatus Roewer: Muma 1970:31.

Type material.—*Eremochelis insignatus*: Male holotype from California, USA (SMF, No. 3014). Female "allotype" from Mercury, Nevada (AMNH). *Therobates cameronensis*: Male holotype from Cameron, Arizona, USA (AMNH). *Therobates arcellus*: Male holotype, female allotype, and 2 female paratypes from Mercury, Nevada, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Arizona, California, Colorado, Nevada. Biome: Great Basin Desert; Mojave Desert.

Eremochelis iviei (Muma 1951)

Therobates iviei Muma 1951:88.

Eremochelis iviei (Muma): Muma 1970:32.

Type material.—Female holotype from Colossal Cave Camp, Pima County, Arizona, USA (AMNH). Male allotype from Colossal Cave, Pima County Arizona, USA (FSCA).

Recorded specimens.—Known from types only.

Distribution.—USA: Arizona. Biome: Sonoran Desert.

Eremochelis malkini (Muma 1951)

Therobates malkini Muma 1951:88.

Eremochelis malkini (Muma): Muma 1970:34.

Type material.—Female holotype from southern rim of Grand Canyon, Arizona, USA (AMNH).

Recorded specimens.—Three females.

Distribution.—USA: Arizona. Biome: Interdesert Grassland.

Eremochelis medialis (Muma 1951)

Therobates medialis Muma 1951:90.

Eremochelis medialis (Muma): Muma 1970:32.

Type material.—Male holotype from California, USA (originally deposited at University of Utah but now at AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: California. Biome: Sonoran Desert.

Eremochelis oregonensis
Brookhart & Cushing 2002

Eremochelis oregonensis Brookhart & Cushing 2002:95.

Type material.—Male holotype from Valley Falls, Lake County, Oregon, USA (DMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Oregon. Biome: Great Basin Desert.

Eremochelis saltoni Muma 1989

Eremochelis saltoni Muma 1989:24.

Type material.—Female holotype from 16 km south of Salton City, California, USA (FSCA).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Southern California. Biome: Sonoran Desert.

Eremochelis tanneri Muma 1989

Eremochelis tanneri Muma 1989:24.

Type material.—Female holotype from the Tecoma Range, Copper Mts., near Lucin, Box Elder County, Utah, USA (FSCA).

Recorded specimens.—Known from type only.

Distribution.—USA: Utah. Biome: Great Basin Desert.

Eremochelis bilobatus group

Eremochelis acrilobatus (Muma 1962)

Therobates acrilobatus Muma 1962:10.

Eremochelis acrilobatus (Muma): Muma 1970:32.

Type material.—Female holotype from Quail Springs, Joshua Tree National Monument, California, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Southern California. Biome: Sonoran Desert.

Eremochelis arcus (Muma 1962)

Therobates arcus Muma 1962:11.

Eremochelis arcus (Muma): Muma 1970:33.

Type material.—Male holotype and fe-

male allotype from Taft, California, USA (AMNH).

Recorded specimens.—Two males and one female.

Distribution.—USA: California and Nevada. Biome: Sonoran Desert; Biotic community: California steppe.

Eremochelis bilobatus (Muma 1951)

Datames pallipes Say: Simon 1879:139 (misidentification, in part).

Eremobates pallipes (Say): Banks 1900:427; Kraepelin 1901:126 (misidentifications); Roewer 1934:555.

Therobates bilobatus Muma 1951:92.

Eremochelis bilobatus (Muma): Muma 1970:33.

Type material.—Male holotype from Davis Mountains, Texas, USA (AMNH). Female allotype from Chiricahua Mountains, Arizona, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Arizona, California, Colorado, New Mexico, Texas. Biome: Sonoran Desert; Chihuahuan Desert; Interdesert Grassland; High Dry Grassland; Cold Dry Grassland.

Eremochelis cochiseae Muma 1989

Eremochelis cochiseae Muma 1989:32.

Type material.—Male holotype, female allotype, 6 male and 3 female paratypes from Portal, Cochise County, Arizona, USA (FSCA).

Recorded specimens.—Seven males and four females.

Distribution.—USA: Arizona. Biome: Sonoran Desert.

Eremochelis cuyamacanus (Muma 1962)

Therobates cuyamacanus Muma 1962:17.

Eremochelis cuyamacanus (Muma): Muma 1970:34.

Type material.—Male holotype and 1 male paratype from Cuyamaca, California, USA (AMNH).

Recorded specimens.—Known from types only.

Distribution.—USA: California. Biome: Sonoran Desert.

Eremochelis flexacus (Muma 1963)

Therobates flexacus Muma 1963:3.

Eremochelis flexacus (Muma): Muma 1970:34.

Type material.—Male holotype and 2 male paratypes from Mercury, Nevada, USA (AMNH).

Recorded specimens.—Three males and one female.

Distribution.—USA: Nevada. Mexico, Baja California. Biome: Mojave Desert.

Eremochelis giboi Muma 1989

Eremochelis giboi Muma 1989:28

Type material.—Male holotype from northeast El Paso Mts., Kern County, California, USA (FSCA).

Recorded specimens.—Known from type only.

Distribution.—USA: California. Biome: California Steppe.

Eremochelis kerni Muma 1989

Eremochelis kerni Muma 1989:30.

Type material.—Male holotype from Roads End, Kern River, Tulare County, California, USA (FSCA). Female allotype from Pearblossom, San Bernardino County, California, USA (FSCA).

Recorded specimens.—Known from types only.

Distribution.—USA: California. Biotic community: California Steppe.

Eremochelis lagunensis Vázquez 1991

Eremochelis lagunensis Vázquez 1991:88.

Type material.—Male holotype, female allotype and 2 male paratypes from Valle de La Laguna, Baja California Sur, Mexico (in collection of I. Vázquez).

Recorded specimens.—Known from types only.

Distribution.—Mexico: Baja California Sur. Biome: Sonoran Desert.

Eremochelis macswaini (Muma 1962)

Therobates macswaini Muma 1962:17.

Eremochelis macswaini (Muma): Muma 1970:34.

Type material.—Male holotype from Crystal Lake, Los Angeles County, California, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: California. Biome: Sonoran Desert.

Eremochelis morrissi (Muma 1951)

Therobates morrissi Muma 1951:90.

Eremochelis morrissi (Muma): Muma 1970:32.

Type material.—Male holotype from Los Angeles, California, USA (AMNH). Female allotype from Riverside County, California, USA (FSCA).

Recorded specimens.—Several males, one female.

Distribution.—USA: Southern California. Biotic community: California Sagebrush.

Eremochelis noonani Muma 1989

Eremochelis noonani Muma 1989:29.

Type material.—Male holotype from Miller Canyon, Eldorado County, California, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: California. Biome: Sonoran Desert.

Eremochelis nudus Muma 1963

Therobates nudus Muma 1963:4.

Eremochelis nudus (Muma): Muma 1970:35.

Type material.—Male holotype from Mercury, Nevada, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Nevada. Biome: Mojave Desert.

Eremochelis plicatus (Muma 1962)

Therobates plicatus Muma 1962:11.

Eremochelis plicatus (Muma): Muma 1970:33.

Type material.—Male holotype, female allotype and unspecified number of paratypes from Mercury, Nevada, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Nevada. Biome: Mojave Desert.

Eremochelis rossi Muma 1987

Eremochelis rossi Muma 1987:11.

Type material.—Male holotype from 3.3 km elevation on north slope of Mt. Popocatepetl, Mexico (CAS).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Desitiro Federal. Biotic community: Sinaloan Thornshrub.

Eremochelis truncus Muma 1987*Eremochelis truncus* Muma 1987:11.

Type material.—Female holotype from Isla Coyote, just north of Isla San Francisco, Baja California Sur, Mexico (CAS).

Recorded specimens.—Known from type only.

Distribution.—Mexico. Biome: Sonoran Desert.

Eremochelis imperialis group*Eremochelis imperialis* (Muma 1951)*Therobates imperialis* Muma 1951:94.*Therobates attritus* Muma 1963:4.*Eremochelis attritus* (Muma): Muma 1976:20.*Eremochelis imperialis* (Muma): Muma 1970:35.

Type material.—*Therobates imperialis*: Male holotype from Palo Verde, Imperial County California, USA (AMNH). Female allotype and 1 paratype from Nye County, Nevada, USA (AMNH). *Therobates attritus*: Female holotype from Mercury, Nevada, USA (FSCA).

Recorded specimens.—Three males and two females.

Distribution.—USA: Arizona, California, Nevada. Mexico: Sonora. Biome: Sonoran Desert.

Eremochelis kastoni Rowland 1974*Eremochelis kastoni* Rowland 1974:1.

Type material.—Male holotype, female allotype, and 8 male and 6 female paratypes from San Diego, San Diego County, California, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: California. Biotic community: California Sagebrush.

Eremochelis larreae (Muma 1962)*Therobates larreae* Muma 1962:21.*Eremochelis larreae* (Muma): Muma 1970:35.

Type material.—Male holotype and female allotype from Mule Canyon, Calico Mountains, San Bernadino County, California, USA (AMNH).

Recorded specimens.—Four males and one female.

Distribution.—USA: California. Biome: Sonoran Desert.

Eremochelis rothi (Muma 1962)*Therobates rothi* Muma 1962:24.*Eremochelis rothi* (Muma): Muma 1970:36.

Type material.—Male holotype from Welton, Yuma County, Arizona, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Arizona. Biome: Sonoran Desert.

Eremochelis undulus Muma 1989*Eremochelis undulus* Muma 1989:34.

Type material.—Male holotype from pits along Sidewinder Road, 17 km west of Colorado River, California, USA (FSCA).

Recorded specimens.—Known from type only.

Distribution.—USA: California. Biome: Sonoran Desert.

Eremochelis striodorsalis group*Eremochelis striodorsalis* (Muma 1962)*Therobates striodorsalis* Muma 1962:25.*Eremochelis striodorsalis* (Muma): Muma 1970:36.

Type material.—Male holotype from Pine Valley, San Diego County, California, USA (AMNH).

Recorded specimens.—Two males.

Distribution.—USA: California. Biotic community: California Sagebrush.

Genus *Hemerotrecha* Banks 1903*Hemerotrecha* Banks 1903:78.*Eremochelis* Roewer 1934:570 (in part).*Eremognatha* Roewer 1934:566 (in part).*Hemerotrecha banksi* group*Hemerotrecha banksi* Muma 1951

Hemerotrecha californica Banks 1903:79 (junior secondary homonym of *Cleobis californica* Banks, 1899).

Hemerotrecha banksi Muma 1951:99 (replacement name).

Type material.—Male holotype from Pacific Grove, California, USA (MCZ).

Recorded specimens.—Numerous males and females.

Distribution.—USA: California. Biotic community: California Chaparral.

Hemerotrecha californica (Banks 1899)

Cleobis californica Banks 1899:314.

Ammotrecha californica (Banks): Banks 1900:427.

Hemerotrecha californica (Banks): Banks 1904:363.

Type material.—Female holotype from Los Angeles, California, USA (MCZ).

Recorded specimens.—Numerous males and females.

Distribution.—USA: California, Idaho, Nevada, Oregon and Washington. Biome: Sonoran Desert; Mojave Desert; Great Basin Desert; Biotic community: California Chaparral; California Grassland.

Hemerotrecha marginata (Kraepelin 1911)

Eremobates marginatus Kraepelin 1911:103.

Eremognatha marginata (Kraepelin): Roewer 1934:567.

Hemerotrecha marginata (Kraepelin): Muma 1951:102.

Type material.—Male holotype and female allotype from San Pedro, California, USA (ZSM Roewer No. 8376).

Recorded specimens.—Several males and females.

Distribution.—USA: California. Biotic community: California Chaparral.

Hemerotrecha truncata Muma 1951

Hemerotrecha truncata Muma 1951:102.

Type material.—Male holotype from Exeter, Tulare County, California, USA (AMNH).

Recorded specimens.—Five males and two females.

Distribution.—USA: California. Biotic community: California Steppe.

Hemerotrecha branchi group*Hemerotrecha bixleri* Muma 1989

Hemerotrecha bixleri Muma 1989:44.

Type material.—Male holotype, 1 male paratype and female allotype from Tucson Mts., Arizona, USA (FSCA).

Recorded specimens.—Known from types only.

Distribution.—USA: Arizona. Biome: Sonoran Desert.

Hemerotrecha branchi Muma 1951

Hemerotrecha branchi Muma 1951:112.

Type material.—Male holotype from Twenty-nine Palms, California, USA (AMNH).

Recorded specimens.—Five males.

Distribution.—USA: Arizona, California, Nevada and New Mexico. Biome: Sonoran Desert, Interdesert Grassland.

Hemerotrecha cornuta

Brookhart & Cushing 2002

Hemerotrecha cornuta Brookhart & Cushing 2002:91.

Type material.—Male holotype, female allotype and 5 male and 2 female paratypes from Boone, Colorado, USA (DMNH).

Recorded specimens.—Known from types only.

Distribution.—USA: Eastern Colorado. Biome: High Dry Grassland.

Hemerotrecha cazieri Muma 1986

Hemerotrecha cazieri Muma 1986:13.

Type material.—Male holotype from sand dunes, San Luis, Sonora, Mexico (CAS).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Sonora. Biome: Sonoran Desert.

Hemerotrecha macra Muma 1951

Hemerotrecha macra Muma 1951:114.

Type material.—Male holotype from Lugert, Oklahoma, USA (originally at University of Utah but now at AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Oklahoma. Biome: High Dry Grassland.

Hemerotrecha milsteadii Muma 1962

Hemerotrecha milsteadii Muma 1962:35.

Type material.—Female holotype from Sierra Vieja, Valentine, Presidio County, Texas, USA (AMNH). Male allotype from Van Horn, Texas, USA (FSCA).

Recorded specimens.—Known from types only.

Distribution.—USA: New Mexico and Texas. Biome: Chihuahuan Desert.

Hemerotrecha minima Muma 1951*Hemerotrecha minima* Muma 1951:114.**Type material.**—Male holotype from Laredo, Texas, USA (AMNH).**Recorded specimens.**—Two males.**Distribution.**—USA: Texas. Biome: Chihuahuan Desert.*Hemerotrecha sevilleta*
Brookhart & Cushing 2002*Hemerotrecha sevilleta* Brookhart & Cushing 2002: 93.**Type material.**—Male holotype, female allotype, 4 males and 3 female paratypes from Sevilleta National Wildlife Reserve, Socorro County, New Mexico, USA (DMNH).**Recorded specimens.**—Several males and females.**Distribution.**—USA: New Mexico. Biome: Chihuahuan Desert.*Hemerotrecha xena* Muma 1951*Hemerotrecha xena* Muma 1951:112.**Type material.**—Male holotype from Coyote Wells, Colorado Desert, California, USA (CUM).**Recorded specimens.**—Known from type only.**Distribution.**—USA: California. Biome: Sonoran Desert.*Hemerotrecha denticulata* group*Hemerotrecha carsonana* Muma 1989*Hemerotrecha carsonana* Muma 1989:41.**Type material.**—Male holotype from Carson City, Lyon County, Nevada, USA (FSCA).**Recorded specimens.**—Known from type only.**Distribution.**—USA: Nevada. Biome: Mojave Desert.*Hemerotrecha delicatula* Muma 1989*Hemerotrecha delicatula* Muma 1989:40.**Type material.**—Male holotype from Nipple Bench, Kane County, Utah, USA (BYU).**Recorded specimens.**—Known from type only.**Distribution.**—USA: Utah. Biome: Great Basin Desert.*Hemerotrecha denticulata* Muma 1951*Hemerotrecha denticulata* Muma 1951:105.**Type material.**—Male holotype, female allotype, and 3 male and 3 female paratypes from Reno, Nevada, USA (AMNH).**Recorded specimens.**—Several males and females.**Distribution.**—USA: California, Colorado, Idaho, Nevada, Utah and Washington. Canada: British Columbia. Biome: Mojave Desert; Great Basin Desert; Cold Dry Grassland.*Hemerotrecha neotena* Muma 1989*Hemerotrecha neotena* Muma 1989:41.**Type material.**—Male holotype, female allotype, and 1 male paratype from Coconino County, Arizona, USA (FSCA).**Recorded specimens.**—Known from types only.**Distribution.**—USA: Arizona. Biome: Interdesert Grassland.*Hemerotrecha parva* Muma 1989*Hemerotrecha parva* Muma 1989:39.**Type material.**—Male holotype from Vernal, Utah, USA (CAS).**Recorded specimens.**—Known from type only.**Distribution.**—USA: Utah. Biome: Great Basin Desert.*Hemerotrecha proxima* Muma 1963*Hemerotrecha proxima* Muma 1963:4.**Type material.**—Male holotype, female allotype, 1 male and 1 female paratype from Mercury, Nevada, USA (AMNH).**Recorded specimens.**—Three males and two females.**Distribution.**—USA: Nevada. Biome: Mojave Desert.*Hemerotrecha serrata* group*Hemerotrecha serrata* Muma 1951*Hemerotrecha serrata* Muma 1951:102.**Type material.**—Male holotype from Twenty-nine Palms, California, USA (AMNH).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: Southern California

and southern Nevada. Biome: Sonoran Desert; Mojave Desert; Great Basin Desert.

***Hemerotrecha simplex* group**

Hemerotrecha fruitana Muma 1951

Hemerotrecha fruitana Muma 1951:106.

Type material.—Male holotype from Fruita, Utah, USA (AMNH).

Recorded specimens.—Numerous males and females.

Distribution.—USA: California, Colorado, Nevada, New Mexico, Utah and Wyoming. Biome: Mojave Desert; Great Basin Desert; High Desert Grassland.

Hemerotrecha jacinotoana Muma 1962

Hemerotrecha jacinotoana Muma 1962:33.

Type material.—Female holotype from Idyllwild, San Jacinto Mountains, California, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: California. Biome: Sonoran Desert.

Hemerotrecha maricopana Muma 1989

Hemerotrecha maricopana Muma 1989:37.

Type material.—Female holotype from South Mountain, Maricopa County, Arizona, USA (CAS).

Recorded specimens.—Known from type only.

Distribution.—USA: Arizona. Biome: Sonoran Desert.

Hemerotrecha nevadensis Muma 1951

Hemerotrecha nevadensis Muma 1951:110.

Type material.—Female holotype from Las Vegas, Nevada, USA (AMNH).

Recorded specimens.—Two females, including holotype.

Distribution.—USA: Nevada. Biome: Mojave Desert.

Hemerotrecha simplex Muma 1951

Hemerotrecha simplex Muma 1951:110.

Type material.—Male holotype from Dry Lake Station, San Diego, California, USA (CUM).

Recorded specimens.—Four males, including holotype.

Distribution.—USA: Arizona, California. Biotic community: California Chaparral.

Hemerotrecha steckleri Muma 1951

Hemerotrecha steckleri Muma 1951:111.

Type material.—Female holotype from Canada del Oro, Santa Catalina Mountains, Arizona, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Arizona. Biome: Sonoran Desert.

Hemerotrecha weneri Muma 1951

Hemerotrecha weneri Muma 1951:111.

Type material.—Male holotype from Cutler, Gila County, Arizona, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Arizona. Biome: Sonoran Desert.

***Hemerotrecha texana* group**

Hemerotrecha texana Muma 1951

Hemerotrecha texana Muma 1951:104.

Type material.—Male holotype from Hot Springs, Texas, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Texas. Biome: Chihuahuan Desert.

Family AMMOTRECHIDAE

Roewer 1934

Ammotrechidae Roewer 1934:578.

Key to males of North American Family Ammotrechidae (males only)

(Modified from Muma (1970))

1. Tarsi of fourth leg with 3 segments 2
- Tarsi of fourth leg with 1 segment *Branchia*
2. Distal segment of tarsi IV with one pair of ventral spine-like setae *Ammotrechella*
- Distal segment of tarsi IV with more than one pair of ventral spine-like setae 3

3. Tarsi IV with 2,2-2-2,2 (see Muma 1951) formula of ventral spine-like setae *Ammotrechula*
Tarsi IV with 2,2-2-2,1 formula of ventral spine-like setae *Ammotrecha*

Subfamily AMMOTRECHINAE Roewer

Ammotrechinae Roewer 1934:590; Muma 1951:123.

Ammotrecha Banks 1900

Cleobis Simon 1879:145 (junior homonym).
Ammotrecha Banks 1900:426.

Ammotrecha chiapasi Muma 1986

Ammotrecha chiapasi Muma 1986:15.

Type material.—Male holotype, female allotype, 2 male paratypes and 1 female paratype taken in house, San Cristobal de las Casas, Chiapas, Mexico (CAS).

Recorded specimens.—Known from types only.

Distribution.—Mexico: Chiapas. Biotic community: Sinaloan thornscrub.

Ammotrecha cobinensis Muma 1951

Ammotrecha cobinensis Muma 1951:135.

Type material.—Male holotype from Cobina, California, USA (originally deposited at University of Utah but now at AMNH).

Recorded specimens.—Two males.

Distribution.—USA: California. Mexico: Unknown (Muma 1970, 1986). Biome: Sonoran Desert.

Ammotrecha itzaana Muma 1987

Ammotrecha itzaana Muma 1987:16.

Type material.—Male holotype and male paratype from Chechen Itza, Yucatan, Mexico (AMNH).

Recorded specimens.—Known from types only.

Distribution.—Mexico: Yucatan. Biome: Savannah.

Ammotrecha limbata (Lucas 1835)

Galeodes limbata Lucas 1835: Cl. 8.
Ammotrecha limbata (Lucas): Kraepelin 1901:112; Roewer 1934:597.

Type material.—Location of the type (*Galeodes limbata*) unknown and a lectotype from Guatemala, number 8356 in ZSM cannot be located.

Recorded specimens.—Three males and two females.

Distribution.—Central America: Guatemala. North America: Mexico. Biome: Unknown.

Ammotrecha stolli (Pocock 1895)

Cleobis stolli Pocock 1895:97.
Ammotrecha stolli (Pocock): Kraepelin 1901:115.
Ammotrecha picta Pocock 1902:65; Roewer 1934:597.

Type material.—*Cleobis stolli*: Female holotype from Retalhuleu, Guatemala (BMNH, Roewer No. 8605). *Ammotrecha picta*: Guatemala. The types of *A. picta* have not been located.

Recorded specimens.—Four males of *A. stolli*, several females.

Distribution.—Central America: Guatemala, Costa Rica, Grenada, Nicaragua. USA: Louisiana. Mexico: Chiapas, Guerrero, Michoacan. Biome: Sinaloan Thornscrub, possibly beach sand.

Genus *Ammotrechella* Roewer 1934

Ammotrecha Banks 1900:426 (in part).
Ammotrechella Roewer 1934:594; Muma 1951:125.

Ammotrechella bolivari Mello-Leitão 1942

Ammotrechella bolivari Mello-Leitão 1942:309.

Type material.—Female holotype from Chiapas, Mexico (MNRJ).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Chiapas. Biotic community: Sinaloan Thornshrub.

Ammotrechella pseustes (Chamberlin 1925)

Ammotrecha pseustes Chamberlin 1925:235.
Ammotrechella sexpicata Muma 1951:129.
Ammotrechella pseustes (Chamberlin): Muma 1970:47.

Type material.—*Ammotrecha pseustes*: Female holotype from Isla Largo Remo, Canal Zone, Panama (MCZ). *Ammotrechella sexpicata*: Female holotype from Claremont, California, USA (originally at University of Utah, now at AMNH).

Recorded specimens.—Known from types only.

Distribution.—Central America: Canal

Zone, Panama, West Indies: Puerto Rico (females only). USA: California. Mexico. Biome: Unknown, possibly beach sand.

Ammotrechella setulosa Muma 1951

Ammotrechella setulosa Muma 1951:125.

Type material.—Female holotype from Eagle Pass, Texas, USA (USNM).

Recorded specimens.—Known from type only.

Distribution.—USA: Texas. Biome: Chihuahuan Desert.

Ammotrechella stimpsoni (Putnam 1882)

Galeodes (*Cleobis*) *stimpsoni* Putnam 1882:261.

Ammotrecha cubae (Lucas): Banks 1900:427 (misidentification).

Ammotrechella stimpsoni (Putnam): Muma 1951:127.

Type material.—Type at MCZ apparently lost or destroyed.

Recorded specimens.—Numerous males and females.

Distribution.—USA: Florida. Biotic community: Widely distributed in sandy soil. Muma (pers. comm.) collected them in mangrove stems.

Genus *Ammotrechula* Roewer 1934

Ammotrechula Roewer, 1934:600

Ammotrechula boneti Mello-Leitão 1942

Ammotrechula boneti Mello-Leitão 1942:312.

Type material.—Male holotype from Mazatlan, Mexico (MNRJ).

Recorded specimens.—Known from type only.

Distribution.—Mexico: Sinoloa. Biome: Sonoran Desert.

Ammotrechula borregoensis Muma 1962

Ammotrechula borregoensis Muma 1962:41; Muma 1989:48

Ammotrechula dolabra Muma 1963:5.

Type material.—*Ammotrechula borregoensis*: Female holotype from Borrego State Park, San Diego, California, USA (AMNH). *Ammotrechula dolabra*: Male holotype from Cane Springs, Nevada, USA (AMNH).

Recorded specimens.—Known from two males and one female.

Distribution.—USA: California, Nevada. Biome: Sonoran Desert.

Ammotrechula catalinae Muma 1988

Ammotrechula catalinae Muma 1988:47.

Type material.—Female holotype and 2 immatures from Santa Catalina Mountains, Pima County, Arizona, USA (FSCA).

Recorded specimens.—Several males and females.

Distribution.—USA: California. Biome: Sonoran Desert.

Ammotrechula lacuna Muma 1963

Ammotrechula lacuna Muma 1963:5.

Type material.—Male holotype from Mercury, Nevada, USA (AMNH).

Recorded specimens.—Known from one male and one female.

Distribution.—USA: Nevada. Biome: Mojave Desert.

Ammotrechula mulaiki Muma 1951

Ammotrechula mulaiki Muma 1951:130.

Type material.—Male holotype from Edinburg, Texas, USA (AMNH).

Recorded specimens.—Known from type only.

Distribution.—USA: Texas. Biome: Chihuahuan Desert.

Ammotrechula peninsulana (Banks 1898)

Cleobis peninsulana Banks 1898:290.

Cleobis hirsuta Banks 1898:291.

Cleobis texana Kraepelin 1899:239.

Ammotrecha texana (Banks): Kraepelin 1901:112.

Ammotrechula texana (Banks): Roewer 1934:601.

Ammotrechula peninsulana (Banks): Muma 1951:130.

Type material.—*Cleobis peninsulana*: Female holotype from San Jose del Cabo, Baja California, Mexico (MCZ). *Cleobis hirsuta*: Male holotype from San Miguel de Horcasitas, Baja California, Mexico (MCZ). *Cleobis texana*: Female holotype from Texas, USA (MNHN, Roewer No. 9099).

Recorded specimens.—Numerous males and females.

Distribution.—USA: Arizona, New Mexico. Mexico: Baja California Sur, Chihuahua, Sinoloa, Sonora. Biome: Chihuahuan Desert; Sonoran Desert; Interdesert Grassland.

Ammotrechula pilosa Muma 1951*Ammotrechula pilosa* Muma 1951:134.**Type material.**—Female holotype from Texas, USA (DZUU).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: Arizona, California, Nevada and Texas. Biome: Chihuahuan Desert; Sonoran Desert; Mojave Desert.*Ammotrechula saltatrix* (Simon 1879)*Cleobis saltatrix* Simon 1879:146.*Ammotrechula saltatrix* (Simon): Kraepelin 1901:113.*Ammotrechula saltatrix* (Simon): Roewer 1934:602.*Ammotrechula saltatrix* (Simon): Muma 1970:54.**Type material.**—Female holotype from Mexico (MNHN, No. 9098).**Recorded specimens.**—One male and two females.**Distribution.**—Mexico: Baja California. Biome: Sonoran Desert.*Ammotrechula venusta* Muma 1951*Ammotrechula venusta* Muma 1951:134.**Type material.**—Male holotype from Tucson, Arizona, USA (AMNH).**Recorded specimens.**—One male and 1 female.**Distribution.**—USA: Arizona. Mexico: Jalisco. Biome: Sonoran Desert.*Ammotrechula wasbaueri* Muma 1962*Ammotrechula wasbaueri* Muma 1962:43.**Type material.**—Male holotype from Andreas Canyon, Riverside County, California, USA (AMNH).**Recorded specimens.**—Three males.**Distribution.**—USA: California. Biome: California Chaparral.SUBFAMILY SARONOMINAE
ROEWER

Saronominae Roewer 1934:580; Muma 1951:135.

Genus *Branchia* Muma 1951*Branchia* Muma 1951:135.*Branchia angustus* Muma 1951*Branchia angustus* Muma 1951:135.**Type material.**—Male holotype and 3

male paratypes from Twenty-nine Palms, California, USA (AMNH).

Recorded specimens.—Four males, two females.**Distribution.**—USA: Arizona, California. Mexico: Sonora. Biome: Mojave Desert.*Branchia brevis* Muma 1951*Branchia brevis* Muma 1951:137.**Type material.**—Male holotype from Edinburg, Texas, USA (AMNH).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: Arizona, Texas, New Mexico. Biome: Chihuahuan Desert; Interdesert Grassland.*Branchia potens* Muma 1951*Branchia potens* Muma 1951:138.**Type material.**—Male holotype from Twenty-nine Palms, California, USA (AMNH).**Recorded specimens.**—Numerous males and females.**Distribution.**—USA: California, Nevada, Utah. Mexico. Biome: Mojave Desert; Sonoran Desert; Great Basin Desert.

DISCUSSION

With this checklist the North American Eremobatinae has been reduced to five genera including Harvey's (2002, 2003) reconstruction of the genera *Eremorhax* and *Eremocosta*. There has been the addition of 60 new species bringing the number to 104 species (Table 1). The number of Therobatinae genera has been reduced to three as a result of Muma's (1970) synonymy of *Therobates* with *Eremochelis*. The species number is 70, an increase of 21 species (Table 2). The Ammotrechinae have four genera and 22 species, an addition of only three new species over 40 years which is not surprising considering the lack of investigative work and the subtropical distribution of this group (Table 3). Fifty-six species are known from the type only and many from only one sex. Muma (pers. comm.) realized that the classification system used with the ammotrechids was cumbersome and faulty, and Harvey (2003) exhorts someone to begin a complete overhaul of the entire system started by Roewer and refined by Muma (1951).

Table 1.—Number of Eremobatinae solifugid species in continental North America.

Genera	Groups	Number of species	
<i>Eremorhax</i>		10	
<i>Eremocosta</i>		13	
<i>Eremothera</i>		2	
<i>Eremobates</i>	Angustus	3	
	Aztecus	1	
	Lapzi	1	
	Pallipes	18	
	Palpisetulosus	41	
	Scaber	12	
<i>Horribates</i>		3	
Total	5	6	104

Because most of the data has come as the result of pitfall trapping in a limited number of areas, caution should be used in basing too many conclusions about the abundance and distribution of solifugids. Since solifugids are for the most part nocturnal and rarely collected, their distribution is sketchy and for the most part skewed towards those communities where some long term collections have taken place (Allred & Muma 1971; Muma 1974a, 1974b; Brookhart & Brantley 2000).

It is likely that collection of more specimens from specific type localities will lead to combining one or more of the putative species. The authors have found that a species

Table 2.—Number of Therobatinae solifugid species in continental North America.

Genera	Groups	Number of species	
<i>Chanbria</i>		4	
<i>Eremohelis</i>	Andreasana	2	
	Branchi	14	
	Bilobatus	16	
	Imperialis	5	
	Striodorsalis	1	
<i>Hemerotrecha</i>	Banksi	4	
	Branchi	9	
	Denticulata	6	
	Serrata	1	
	Simplex	7	
	Texana	1	
Total	3	11	70

Table 3.—Number of Ammotrechid solifugid species in continental North American.

Genera	Number of species	
<i>Ammotrecha</i>	5	
<i>Ammotrechella</i>	4	
<i>Ammotrechula</i>	10	
<i>Branchia</i>	3	
Total	4	22

known from only one or two specimens is often valid (Brookhart & Cushing 2002). Readers are referred to Scharff et al. (2003) for the discussion of “singletons”.

This is the first specific attempt to organize solifugids in terms of biogeographic distribution. A few generalizations can be made. At the generic and specific levels it should be pointed out that although certain genera and species are found in two or more deserts or grasslands, others are confined to only one desert or grassland. The four major recognized deserts of North America support a large, more diversified solifugid fauna than the adjacent arid grasslands (Table 4). Although each supports a distinctive solifugid fauna, there are some species that are found in several biomes. This may indicate a greater ability to occupy a variety of niches but more likely it indicates that these identified species are really more than one and further investigation is warranted. Recent studies indicate that most species of solifugids occupy a more narrow geographical range than previously

Table 4.—Number of solifugid species recorded in continental North American biomes. (Total number exceeds number of identified species ($n = 192$) because some species are found in more than one biome.)

Biome	Number of species
Chihuahua Desert	32
Sonoran Desert	82
Mojave Desert	28
Great Basin Desert	18
Interdesert Grassland	22
High Dry Grassland	10
Cold Dry Grassland	6
California Xeric Localities	33
Sinoloan Thornshrub	8

thought (Brookhart & Brantley 2000; Brookhart & Cushing 2004). Members of species groups appear to be allopatric, with only the *E. palpisetulosus* group showing much sympatry (Brookhart & Muma 1981, 1987; Muma & Brookhart 1988; Brookhart & Cushing 2004).

The Sonoran Desert supports the greater number of genera (11) and species (82) despite the fact that it is the hottest and driest and has been subject to the least long term investigation. The Chihuahuan has only 8 genera and 32 species even though it has been the subject of most of the long term studies used in this paper. As expected, the cold deserts have the fewest solifugids. The Mohave Desert is inhabited by 4 genera, 28 species and Great Basin Desert has 7 genera and 18 species (Table 4). Seven genera and 63 species are found in Mexico and two genera and three described and one undescribed species are found in Canada.

Five genera (*Chanbria*, *Horribates*, *Eremothera*, *Therobates*, *Ammotrecha*) have not been collected in great numbers. *Chanbria* has been collected in dune areas only. Until more long term research studies such as Sevilleta LTER (Brookhart & Brantley 2000) are conducted from several widely dispersed areas conclusions as to solifugid distribution will be sketchy.

ACKNOWLEDGMENTS

This paper is largely a tribute to the late Martin Muma who contributed so much to the knowledge of North American solifugids. His unpublished paper on the biogeography of solifugids was the basis for our efforts. We are extremely grateful to our editor, Mark Harvey for the heroic effort in formatting our paper and to the reviewers, A. Gromov and I. Vázquez for their many helpful suggestions. Gratitude is extended especially to Paula Cushing for her editorial help, and to John T. and Dan Polhemus for their advice and encouragement.

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Manuscript received 7 January 2004, revised 10 December 2004.